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ABSTRACT

A questionnaire was distributed to a population of science education doctoral students to collect data about the role of the library in providing information resources needed by doctoral students in science education (both Ed.D. and Ph.D.) at the University of Georgia. Doctoral students were selected for the study because they will eventually teach potential scientists and science educators and perform research in science education, and will probably be the heavist library users in their discipline with the exception of the faculty. Knowledge about how and where to locate the information they require for research and instruction is essential for them to competently perform their role as educators. It was found that the student group: (1) relied primarily on manual searches of indexes and abstracts, journals, and citations; (2) used traditional print materials extensively (i.e., books, periodicals, and textbooks); (3) obtained materials directly from the library, rather than using alternate methods such as interlibrary loan, with the most frequently used alternative method being borrowing from faculty or colleagues; (4) thought that an online catalog would have been useful to them when writing their dissertations; and (5) used very similar strategies for identifying and obtaining information during their coursework and the dissertation phases. A copy of the questionnaire and sample correspondence with the participants are appended. The text contains 48 tables. (27 references) (SD)

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A STUDY OF THE INFORMATION RESOURCES AND LIBRARY SERVICES USED BY DOCTORAL STUDENTS IN SCIENCE EDUCATION AT THE UNIVERSITY OF GEORGIA

by

Mary L. Compton

B.S., SUNY at Geneseo, 1978
M.L.S., SUNY at Geneseo, 1979

An Applied Project Submitted to the
Department of Science Education
of the University of Georgia
in Partial Fulfillment

of the

Requirements for the Degree

MASTER OF EDUCATION

Athens, Georgia

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Chapter 1

Introduction

Science education was defined by Yager (1984) as "the discipline concerned with the study of the interaction of science and society ... . Their interaction becomes reality and the interlocking concept for the discipline. Research in science education centers upon this interface" (p. 36). As part of the Special Study Committee's report, Yager (1978) listed eight priorities for research in teaching and learning science. These priorities were teacher characteristics, student characteristics, social imperatives, pedagogy, classroom climate, implementation activities, student attitudes, and scientific literacy. He concluded that finding order and common direction for research efforts in science education should be a goal for the 1980s.

Gabel, Samuel, Helgeson, Novak, and Butzow (1986) and Gabel et al. (1987) surveyed secondary science teachers and elementary teachers who teach science to ascertain their research interests in science education. Secondary science teachers were interested in laboratory experiences, motivational techniques, effect on college courses, problem

solving, and meaningful learning. The order in which these interests were ranked varied with the scientific discipline taught (Gabel et al., 1986). Elementary teachers' interests were in "hands-on" experiences, science content of the curriculum, cognitive development and learning styles, problem solving, teaching strategies, gifted children, sequencing of science content, barriers to science teaching, effective printed materials, and pupil attitudes (Gabel et al., 1987). The results of both surveys can be used to indicate the interests of practicing teachers to researchers in science education. A 1986 conference of mathematicians, scientists, cognitive scientists, mathematics and science educators, and curriculum and technology experts made four recommendations concerning research in science education (Linn, 1987). These recommendations included: (a) establish centers for collaboration in science education; (b) expand opportunities for sharing information; (c) increase fundamental understanding of science learning; (d) strengthen response to instructional needs. Science educators have indeed spent the eighties finding order and common direction for their research efforts.

The goal of doctoral work in science education is to provide students with knowledge and skills needed for

teaching in their specific science disciplines and for researching topics of interest to science educators (Doctorate in Science Education, 1987). Science educators perform their roles in a variety of contexts, including public schools, colleges and universities, governmental agencies, and industry. They serve as preservice or inservice teacher educators, supervisors or coordinators of science instuctors, developers or implementors of curricula, evaluators of teaching and learning, and research specialists in science education. In order to be effective in their various roles, science educators must possess a knowledge base in both science and education. They must also be "constructive and creative users of information" (Butts, 1974, p. 30).

Unlike most other professions teachers need to be competent in two areas: teaching, and the academic discipline in which they teach. They need to be able to identify, access, and apply relevant information to their unique situations. Their needs are as diverse as the disciplines they teach. The breadth of information that a teacher needs on a subject may also differ from that of researchers in that subject.

Purpose of the Study

The purpose of this study was to investigate the role of the library in providing information needed by doctoral students in science education at the University of Georgia.

Doctoral students were selected for the study for two reasons. These students will eventually teach potential scientists and science educators, and perform research in science education. Secondly, outside of the faculty, this group should be the heaviest library users in the discipline. Knowledge about how and where to locate the information they require for research and instruction is essential for them to effectively perform their role as educators. Knowledge about how effectively the library is serving the needs of doctoral students will enable the library to determine what, if any, improvements it could make in fulfilling the information needs of science educators in general.

The study addressed the following questions:

1a. How did doctoral students in science education at the University of Georgia identify the information resources they needed to complete course assignments?

1b. How did doctoral students in science education at the University of Georgia identify the information resources they needed to complete their dissertations?

2a. What types of information resources did doctoral students use and to what extent did they use them to complete their course assignments?

2b. What types of information resources did doctoral students use and to what extent did they use them to complete their dissertations?

3a. How did doctoral students in science education at the University of Georgia obtain the information resources they needed to complete course assignments?

3b. How did doctoral students in science education at the University of Georgia obtain the information resources they needed in order to complete their dissertations?

4a. According to the students, what role did the library play in providing them with the information resources and services they needed during the coursework phase of their doctoral programs?

4b. According to the students, what role did the library play in providing them with the information resources and services they needed during the dissertation phase of their doctoral programs?

5. Were there differences in the strategies used to identify and obtain information resources needed to complete the coursework and dissertation phases of doctoral students' programs of study?

6. For students that have completed their doctoral program, were there information resources or library services they did not use, but now feel would have been beneficial to use?

7. What differences, if any, exist between the strategies used to identify and obtain information resources of students currently enrolled in the doctoral program and those who have graduated?

Method of Study

A questionnaire was distributed to a population of science education doctoral students to collect data about the role of the library in providing the information resources needed by doctoral students in science education at the Univeristy of Georgia. The strategies used for identifying, locating, and obtaining information resources during the coursework and the dissertation phases of their programs were compared. Differences in strategies between those who have graduated from and those currently enrolled

in the program were also studied.

Summary

In order to be effective users of information, doctoral students in science education must be able to locate and obtain the information resources they need to complete both their coursework and their dissertations. Success in this endeavor is two-fold. The students must know how to identify needed information resources and they must be able to locate the information resources in the library or elsewhere. The purpose of this study was to determine how doctoral students in science education at the University of Georgia identify the information resources they need and if the University of Georgia Libraries play a significant role in fulfilling their information needs.

Chapter 2

Review of the Literature

The studies reviewed were those concerning the information needs of practicing educators, the library skills of graduate students, the library skills of undergraduate students in education, and the library skills and information needs of graduate students.

Library Skills and Information Needs of Practicing Educators

The first aspect reviewed was that of the information needs of practicing educators. Most of the research bearing on information needs in education dealt with practicing educators, including teachers, counselors, and administrators. Most studies were concerned with the information interests of educators and not with the types and/or availability of the materials they needed.

In a study of educational practitioners (teachers, administrators, and support personnel), Matheson (1979/1980) investigated (a) the personal, professional, and psychological characteristics of the users of information, (b) their purposes for seeking information, (c) the sources they used, (d) the characteristics of sources that were

important to them, and (e) the problems they encountered in seeking or using educational information. The qualitative data obtained from this study allowed her to stratify public school teachers and administrators into four subgroups of users based on their positions within the school system and to determine the extent to which personal, psychological, and professional attributes influenced their use of various sources of information. In a follow-up report by Summers, Matheson, and Conry (1983), two variables, education position and attitude toward information, were the strongest predictors of the type of information seeking behavior used by an individual.

Summers, Conry, and Matheson (1984) went one step farther in the next re-examination of their data. They investigated the relationship between education position and (a) purposes in seeking information and (b) sources of information used. They found that characteristics of user subgroups, including work role, affect their information seeking and use behaviors. Individuals in administrative postions tend to seek more information and have a greater variety of purposes for seeking information than classroom teachers. The variety of sources used appears to increase with professional responsibility.

Classroom teachers were mostly concerned with teaching methods, locating new materials and facts, motivating students, developing new material, and problem solving (interests similar with the findings of Gabel et al., 1986 and 1987). The interests of support personnel, such as counselors, were the same as those of classroom teachers, but also included broader interests such as curriculum development, evaluation, professional development, classroom management, decision making, and public reaction. The interests of administrators included both of the above (Summers et al., 1984).

Differences in the sources of information used were also found. Classroom teachers tended to use sources that were close at hand and more traditional, such as books and journals. Support personnel broadened this to include less accessible information sources such as workshops and conventions. Administrators were the most frequent and active users of information. Consideration of these characteristics should be made when designing information products and services and developing information delivery systems (Summers, et al., 1984).

Davis (1987) replicated and extended the research initiated by Matheson (1979/1980). Davis' data verified and

generalized many of the significant relationships identified in the Matheson study. Davis was also able to provide a general description of the Oregon educational information user. The information interests of classroom teachers, support personnel, and administrators were similar to those found by Summers, et al., (1984). All groups used school-based sources primarily, but support personnel and administrators often used research-based sources as well. Davis's results indicated that three major factors influence the information seeking and use patterns of Oregon educators. These factors are: the strength of one's attitude toward information, the degree to which the educator seeks out and/or delivers information to others, and the degree of training one has received in finding and interpreting information.

Holmes (1987) investigated the information seeking behavior of secondary science teachers in selected public schools in Florida. The goal of her study was to provide empirical data to be used by school/library media specialists and other information providers to plan, design, and maintain more effective and efficient information systems for science teachers. The major findings of this study were: (a) science teachers rely heavily on textbooks,

regardless of the subject taught, the level of the course taught, or personal or professional characteristics; (b) teachers tend to rate the academic library as "excellent", but use their own personal libraries more often; (c) lack of time was the most frequent problem in obtaining information; and (d) characteristics of an ideal information system would include convenience, currency, relevancy, use of computer technologies, appropriate staff, and timeliness.

An exploratory study to determine if providing library instruction to teachers would improve the library skills of their college bound students was conducted by Schmidt (1987). Her results indicated that for those teachers receiving library instruction, their use of the library increased and their library skills improved significantly. However, within the confines of this study, their students' library skills did not show immediate improvement, nor did their students' use of the library increase.

Faulkner (1985) prepared a presentation for practicing teachers and librarians to provide practical information on how to integrate library and resource material use into class projects. His goal was to show teachers how to incorporate available information resources into classroom

use, rather than instruct them in the use of library research materials not available to them.

A study of junior college educators by Mathies (1967) revealed that their information needs were centered upon curriculum and instruction. While they actively seek information on such matters, these educators contribute little research to this area.

Gleaves, Scepanski, and Mazini (1984) surveyed members of the faculty of the George Peabody College for Teachers of Vanderbilt University to determine their information needs, habits, and attitudes and to learn how the process of information gathering might influence the direction of library policy. Their findings indicated that the Peabody faculty relied most heavily on print materials, especially periodicals and books, as information resources and much less on microforms, theses, audiovisual materials, and other non-book formats. The Peabody faculty usually identified relevant published information resources by scanning journals, abstracts, and indexes and expressed a preference for traditional print library research tools. Recency was an important factor in determining whether a particular resource, book or journal, was required for their research. Consultation with colleagues was also considered an

important source of information.

Library Skills of Undergraduate Students in Education

The library skills of undergraduate education majors have been the subject of two papers. O'Hanlon (1987) stated that education faculty support the teaching of the library research process, but do not view the development of library skills as necessarily related to the development of critical-thinking skills. Elementary and secondary school teachers influence their pupils' attitudes toward learning and the use of educational resources such as libraries. O'Hanlon (1988) proposed that the best place to foster good information seeking skills and to promote positive attitudes toward library use for all students is in library instruction programs for those who will influence future generations of students: the teacher trainees. In support of this view Schmersahl (1987) wrote that teachers of writing should engage the help of reference librarians when teaching library research skills to their students and that teaching library research skills is necessary in order to teach students to write focused and informative research papers.

Library Skills and Information Needs of Graduate Students

More data are available on the need for library instruction for graduate students than on their information needs or use. Madland (1985) stated that graduate students arrive on campus with library skills ranging from "naive to rusty to sophisticated" (p. 163). Graduate faculty often assume that graduate students have adequate research skills, but graduate students often realize they would benefit from library instruction. Library instruction programs have often been modified to take care of the special needs of international students (Cope and Black, 1985). Bailey (1985) proposed that active intervention on the part of librarians can prevent much of the frustration that the graduate student experiences in starting to research a topic. The Ohio State University Libraries have been successful in offering interdisciplinary graduate workshops on library research methods (Bradigan, Kroll, and Sims, 1987). Other studies maintained that library instruction should be integrated either into the teaching of research methods and techniques (Brice and Copeland, 1951) or into the teaching of the subject (Mayfield, 1985).

Alire (1984) conducted a nationwide survey of education doctoral students' attitudes regarding the importance of the

library and the need for bibliographic instruction. In her findings she stated: (a) Over two-thirds of the doctoral students in schools of education thought that knowledge of the library and its resources was important to their academic success. (b) More than half of the doctoral students thought that library usage is important to their academic success. (c) Over half of the doctoral students thought that they had deficiencies in library knowledge. (d) More than half of the doctoral students surveyed felt they needed bibliographic instruction. (e) The majority of students agreed that a course in library research methodology should be required in programs where dissertations were mandatory. (f) The majority of doctoral students indicated that they would have taken an elective course in library research methodology if it had been available.

Farid, Snyder, and Palmquist (1984) surveyed doctoral students at Syracuse University in six disciplines (economics, English, geology, history, philosophy, and physics) to investigate their information seeking behaviors. The major contribution of this study was the insight gained in understanding the information seeking behavior of doctoral students in the coursework and disseratation phases

of their doctoral program. Their results indicated that most doctoral students in the coursework phase of their programs, except history students, relied heavily on textbooks, journal articles, and material referred to by the instructor to look for a representative set of references on the research topic, while students in the dissertation phase of their doctoral programs, regardless of discipline, maximized their search for relevent references on the research topic. The study also revealed that many doctoral students were either not aware of the services or tools offered by the Syracuse University Libraries or just did not answer questions concerning these tools or services. Unfamiliarity with the terminology of these library tools or services may have contributed to this finding.

Summary

Most of the studies dealing with the information needs of practicing educators were concerned with the research interests of the educators. Those studies that addressed the types of information resources educators used indicated that educators rely heavily on traditional print sources to identify pertinent research material and that this research material is also usually in print format. Some studies have

been performed on the information needs of graduate students in education. In several of these studies graduate students, including doctoral students in education, indicated a need for instruction in library research methodology. One study indicated that the depth of information needed during the coursework phase is less that that needed during the dissertation phase of the doctoral program in most disciplines studied. A study was not found that addressed the information needs or library skills of doctoral students in science education.

Chapter 3

Method of Study

A questionnaire was distributed to a population of science education doctoral students to collect data to answer the research questions.

Description of the Population

The population group for this study was comprised of doctoral students (Ed.D. and Ph.D. students) currently enrolled or recently graduated from the Science Education Department at the University of Georgia. Currently enrolled students had started their program of study by the Fall Quarter 1988. The students who had graduated from the program completed their program of study after the Fall Quarter 1979. This population included five categories of students: (a) three quarters or less of coursework completed; (b) more than three quarters of coursework completed, dissertation not begun; (c) more than three quarters of coursework completed, dissertation in progress; (d) coursework completed, dissertation in progress; and (e) completion of program.

Description of the Instrument

A survey method was selected to complete the study (see Appendix A). The questionnaire was designed to address the research questions. It was divided into three parts. The first part gathered data on the use of library resources during the coursework phase of their doctoral program. All students were asked to complete this part. The second part asked the same questions, but about the disseration phase of their doctoral program. All students that were working on or had completed their disseratation were asked to complete this part. The third part asked students who had completed the program about the library services and information resources they did not use while in graduate school. During January 1989 the questionnaire was mailed to 57 doctoral students in science education who fit the criteria stated above. A cover letter explaining the purpose of the research, and a statement of support from my advisor, Kenneth S. Ricker, was enclosed, as well as participant research information on the verso of the letter (see Appendix B). Fifty-seven questionnaires were mailed and 30 (58%) responses were received (see Table 1). Five questionnaires were returned due to incorrect addresses.

Table 1
Responses Received by Category of Student

Category of student	Number distributed*	Number of responses	Percentage of response
Less than 3 quarters of coursework completed	5	1	20
More than 3 quarters of coursework completed, dissertation not begun	5	3	60
More than 3 quarters of coursework completed, dissertation in progress	4	2	50
Coursework completed, dissertation in progress	7	2	29
Graduated from the program	31	22	71
Total	52	30	58

*Note: Five questionnaires distributed were returned due to incorrect addresses.

Analysis

This report is descriptive in nature. Due to the small number of students involved in the study, tests of statistical significance were not judged applicable. The first four categories of students were collapsed into one category. These students are henceforth referred to as the "currently enrolled students." Students who had completed their doctoral programs are referred to as "program completed students." The responses were tabulated and are presented Tables 2-27.

Limitations of the Study

This study was confined to doctoral students from the Science Education Department in the College of Education at the University of Georgia. To be included in the study population, a student must have enrolled in the doctoral program no later than Fall Quarter 1988 and not graduated from the program earlier than Winter Quarter 1980. It included both Doctor of Education (Ed.D.) and Doctor of Philosophy (Ph.D.) students and excluded all other graduate and undergraduate students in science education at the University of Georgia.

Summary

A questionnaire was developed to gather data to determine the role of the library in satisfying the information needs of doctoral students and to determine what types of information resources they use to complete their course assignments and dissertations. The questionnaire was distributed to a population of doctoral students in science education in January 1989. Results were tabulated and are presented in Tables 2-27.

Chapter 4

Results of Study

This Chapter contains the descriptive statistics and results relative to each of the research question stated in Chapter 1.

Methods Used to Identify Information Resources

To determine what methods doctoral students in science education used to identify the information resources they needed to complete their course assignments and their dissertations, students were asked to rate the extent to which they used methods listed in question 1 of Parts A and B of the questionnaire (see Appendix A).

Question 1a. How did doctoral students in science education at the University of Georgia identify the information resources they needed to complete course assignments?

The results presented in Table 2a show that over 70% of the students relied extensively or frequently on manual searches of journals, manual literature searches, and citations from other sources to identify the information resources they needed. Forty to 47% of the students frequently consulted with faculty or with colleagues, or

Table 2a
Methods Used to Identify Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	3(10)	8(27)	6(20)	9(30)	4(13)
manual lit search	3(10)	18(60)	7(23)	2(7)	0(0)
manual search of journals	8(27)	16(53)	4(13)	2(7)	0(0)
subject card catalog	2(7)	4(13)	12(40)	10(33)	2(7)
online catalog	3(10)	9(30)	2(7)	7(23)	7(23)
citations from other sources	10(33)	12(40)	6(20)	2(7)	0(0)
consulted faculty	3(10)	14(47)	10(33)	3(10)	0(0)
consulted colleagues	3(10)	12(40)	10(33)	5(17)	0(0)
reference materials	1(3)	14(47)	8(27)	5(17)	2(7)

n=30.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

used reference materials to identify information resources. Computerized literature searches, the subject card catalog, and the online catalog were used rarely or never by 40% of the students during this phase of their doctoral program.

Question 1b. How did doctoral students in science education at the University of Georgia identify the information resources they needed to complete their dissertations?

During the dissertation phase of their programs, 75% (see Table 2b) of the students extensively or frequently used manual literature searches, manual searches of journals, and citations from other sources to identify the information resources they needed. Fifty-three percent of the students made extensive or frequent use of the computerized literature search services offered by the Libraries to identify information resources. Over 60% of the students frequently or occasionally consulted with faculty or with colleagues to identify resources. The subject card catalog was occasionally used by 42% of the students. The online catalog was rarely or never used by 42% of the students during the dissertation phase.

Table 2b
Methods Used to Identify Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	7(27)	7(27)	6(23)	4(15)	1(4)
manual lit search	14(54)	7(27)	4(15)	0(0)	0(0)
manual search of journals	16(62)	7(27)	2(8)	0(0)	0(0)
subject card catalog	3(12)	3(12)	11(42)	7(27)	1(4)
online catalog	2(8)	8(31)	3(12)	6(23)	5(19)
citations from other sources	13(50)	7(27)	5(19)	0(0)	0(0)
consulted faculty	5(19)	9(35)	8(31)	3(12)	0(0)
consulted colleagues	5(19)	8(31)	10(38)	2(8)	0(0)
reference materials	4(15)	7(27)	8(31)	4(15)	2(8)

n=26.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Information Resources Used

Doctoral students were asked to rate the extent to which they used each of the information resources listed in question 2 of Parts A and B of the questionnaire while completing their course assignments and their dissertations respectively. These results are presented in Tables 3a and 3b.

Question 2a. What types of information resources did doctoral students use and to what extent did they use them to complete their course assignments?

These results indicate that periodicals; books, other than textbooks; and textbooks were extensively or frequently used by over 80% of the students. Fifty-six percent of the students extensively or frequently used statistical software, ERIC documents, and reference materials. Table 3a also indicates occasional use of dissertations and theses (60%), curriculum materials written for students (52%), and curriculum materials written for teachers (40%) by the students. At least 64% of the students rarely or never used audiovisual materials, government documents, popular media, and instructional software.

Table 3a
Information Resources Used During the Coursework Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E	F	O	R	N
Resource Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks	5(20)	16(64)	3(12)	1(4)	0(0)
textbooks	5(20)	15(60)	3(12)	2(8)	0(0)
periodicals	13(52)	11(44)	2(8)	0(0)	0(0)
curriculum mat. for teachers	2(8)	4(16)	10(40)	7(28)	2(8)
curriculum mat. for students	0(0)	3(12)	13(52)	6(24)	3(12)
audiovisual materials	0(0)	1(4)	5(20)	14(56)	5(20)
instructional software	0(0)	1(4)	7(28)	10(40)	6(24)
statistical software	2(8)	12(48)	6(24)	3(12)	2(8)
ERIC documents	4(16)	10(40)	9(36)	1(4)	1(4)
government documents	0(0)	1(4)	6(24)	4(16)	14(56)
dissertations & theses	1(4)	2(8)	15(60)	7(28)	0(0)
popular media	0(0)	1(4)	8(32)	13(52)	3(12)
reference materials	2(8)	12(48)	7(28)	3(12)	1(4)

n=25.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Question 2b. What types of information resources did doctoral students use and to what extent did they use them to complete their dissertations?

One hundred percent of the students made extensive or frequent use of periodicals while preparing their dissertations (see Table 3b). Extensive or frequent use was also made of statistical software and ERIC documents by at least 78% of the students. The students used books, other than textbooks, (72%) frequently or occasionally. Dissertations and theses and textbooks were occaisionally used by 40% of the students. Curriculum materials written for teachers were occasionally or rarely used by approximately 64% of the students. Audiovisual materials, popular media, curriculum materials written for students, instuctional software, and government documents were rarely or never used by at least 64% of the students. No clear pattern could be determined for use of reference materials.

Methods Used to Obtained Information Resources

The students were first asked to indicate the extent to which they obtained the information resources listed in question 3 in Parts A and B of the questionnaire from the

Table 3b
Information Resources Used During the Dissertation Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E	F	O	R	N
Resource Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks	6(24)	9(36)	9(36)	0(0)	1(4)
textbooks	0(0)	6(24)	11(44)	6(24)	2(8)
periodicals	23(92)	2(8)	0(0)	0(0)	0(0)
curriculum mat. for teachers	1(4)	4(16)	8(32)	8(32)	4(16)
curriculum mat. for students	0(0)	3(12)	5(20)	5(20)	12(48)
audiovisual materials	2(8)	0(0)	3(12)	5(20)	15(60)
instructional software	1(4)	5(20)	2(8)	6(24)	10(40)
statistical software	17(68)	5(20)	1(4)	1(4)	1(4)
ERIC documents	7(28)	12(48)	4(16)	3(12)	0(0)
government documents	0(0)	2(8)	7(28)	7(28)	9(36)
dissertations & theses	4(8)	9(36)	12(48)	0(0)	0(0)
popular media	0(0)	3(12)	4(16)	6(24)	12(48)
reference materials	3(12)	6(24)	7(28)	6(24)	3(12)

n=25.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

University of Georgia Libraries. In questions 4a and 4b of Parts A and B of the questionnaire the students were asked about their use of interlibrary loan service to obtain items the Libraries did not own. Question 5 in Parts A and B of the questionnaire then asked the students to rate the extent to which they used other methods to obtain the information resources they needed that the Libraries did not own.

Question 3a. How did doctoral students in science education at the University of Georgia obtain the information resources they needed to complete their course assignments?

During the coursework phase of their doctoral programs, the students obtained some information resources extensively or frequently, but some other resources rarely or never from the University of Georgia Libraries (see Table 4a). More than 88% of the students who used ERIC documents and periodicals obtained them extensively or frequently from the Libraires. Seventy-five percent of the students obtained the books, other than textbooks, that they used extensively or frequently from the Libraries. Forty-four percent of the students who used government documents obtained them extensively or frequently from the Libraries. Fifty-two percent of the

Table 4a
Extent to Which Information Resources Were Obtained from the UGA Libraries During the Coursework Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	7(29)	11(46)	3(13)	3(13)	0(0)
textbooks (a)	2(8)	2(8)	6(25)	5(21)	5(21)
periodicals (a)	17(71)	4(17)	3(13)	0(0)	0(0)
curriculum mat. for teachers (b)	2(9)	5(22)	5(22)	7(30)	4(17)
curriculum mat. for students (b)	1(4)	4(17)	7(30)	5(22)	6(26)
audiovisual materials (c)	1(5)	1(5)	5(21)	8(38)	6(29)
instructional software (c)	1(5)	1(5)	4(19)	4(19)	9(43)
statistical software (c)	4(21)	3(16)	3(16)	2(11)	10(53)
ERIC documents (d)	11(50)	9(41)	2(9)	0(0)	0(0)
government documents (e)	5(31)	2(13)	5(31)	1(6)	3(19)
dissertations & theses (b)	5(22)	6(26)	6(26)	3(13)	3(13)
popular media (f)	6(32)	2(11)	5(26)	5(26)	1(5)
reference materials* (b)	9(39)	8(35)	4(17)	2(9)	0(0)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=24; (b)n=23; (c)n=21; (d)n=22; (e)n=16; (f)n=19.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 4b
Extent to Which Information Resources Were Obtained from the UGA Libraries During the Dissertation Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	8(40)	8(40)	1(5)	2(10)	1(5)
textbooks (b)	2(12)	0(0)	6(38)	5(31)	3(19)
periodicals (a)	15(71)	4(19)	0(0)	0(0)	1(5)
curriculum mat. for teachers (c)	4(21)	2(10)	3(16)	4(21)	6(32)
curriculum mat. for students (d)	3(20)	1(7)	2(13)	3(20)	6(40)
audiovisual materials (e)	1(9)	0(0)	2(18)	2(18)	6(55)
instructional software (F)	2(14)	1(7)	3(21)	1(7)	6(43)
statistical software (c)	7(37)	2(10)	1(5)	3(16)	6(32)
ERIC documents (c)	13(68)	3(16)	1(5)	1(5)	1(5)
government documents (g)	6(40)	3(20)	3(20)	1(7)	2(13)
dissertations & theses	9(47)	4(21)	4(21)	1(5)	1(5)
popular media (h)	4(31)	1(8)	4(31)	3(23)	1(8)
reference materials* (i)	10(50)	6(30)	2(10)	1(5)	1(5)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=20; (b)n=16; (c)n=19; (d)n=15; (e)n=11; (f)n=14; (h)n=13; (i)n=21.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

students who used dissertations and theses obtained them frequently or occasionally from the Libraries. Materials obtained occasionally or rarely from the Libraries by 52% of the students who used them were curriculum materials written for teachers, curriculum materials written for students, and popular media. Audiovisual materials, instructional software, and statistical software were rarely or never obtained from the Libraries by at least 60% of the students who used these materials. No clear pattern could be determined for the extent to which students obtained textbooks from the Libraries.

Sixty-four percent of the students used interlibrary loan to try to obtain information resources that the University of Georgia Libraries did not own (see Table 5a). Only 17% made frequent use of this service, and none of the students made extensive use of the service. Sixty-nine percent of the students were either extensively or frequently successful in obtaining the requested item.

Table 6a presents the data obtained from question 5 of Part A of the questionnaire. Forty-eight percent of the students frequently borrowed information resources they needed from faculty members. Thirty-eight percent of the students frequently borrowed information resources from

Table 5a
Use of Interlibrary Loan (ILL) to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	0(0)	5(17)	6(20)	8(27)	11(36)
extent of success (b)	4(25)	7(44)	4(25)	0(0)	1(6)

(a)n=30; (b)n=16.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 5b
Use of Interlibrary Loan (ILL) to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	3(14)	6(29)	6(29)	3(14)	3(14)
extent of success (b)	5(32)	8(32)	3(16)	1(5)	1(5)

(a)n=21; (b)n=19.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 6a
Alternate Methods Used to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	1(4)	14(48)	11(38)	3(10)	0(0)
borrow from colleagues	1(4)	11(38)	7(24)	10(34)	0(0)
visit other libraries	1(4)	0(0)	4(14)	10(34)	14(48)
borrow from Sci. Ed. Dept.	3(10)	7(24)	8(27)	9(31)	2(7)
borrow from other Ed. Dept.	1(4)	1(4)	4(14)	8(27)	15(52)
purchase resource	1(4)	8(27)	11(38)	5(17)	4(14)
use alternate resource	0(0)	5(17)	8(27)	8(27)	6(21)

n=29.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

colleagues. Thirty-eight percent occasionally purchased information resources themselves. Fifty-four percent occasionally or rarely used an alternate information resource when they could not obtain the one they needed. Forty percent of the students rarely or never borrowed information resources from the Science Education Department collection, while 34% of the students used this method extensively or frequently. Visiting other libraries and borrowing information resources from other College of Education departmental collections were rarely or never used by at least 80% of these students.

Question 3b. How did doctoral students in science education at the University of Georgia obtain the information resources they needed in order to complete their dissertations?

Ninety-five percent of the students who used periodicals; books, other than textbooks; and ERIC documents to complete their dissertations obtained them extensively or frequently from the Libraries (see Table 4b). At least 60% of those who used government documents and dissertations and theses obtained them extensively or frequently from the Libraries. Thirty to 40% of the students who used textbooks and popular media obtained them occasionally from the Libraries. Information

resources obtained rarely or never from the Libraries by the students who used them were audiovisual materials (73% of the students), curriculum materials written for students, (60%), curriculum materials written for teachers (52%), instructional software (50%), and statistical software (47%).

Seventy-two percent of the students used interlibrary loan at least occasionally to try to obtain information resources not owned by the University of Georgia Libraries (see Table 5b). Seventy-four percent of the students who used interlibrary loan to obtain needed resources were extensively or frequently successful in obtaining the requested items.

Table 6b presents data concerning the extent to which the students used the alternate methods to obtain information resources the University of Georgia Libraries did not own. At least 59% of the students frequently or occasionally borrowed information resources from faculty members or colleagues, the Science Education Department collection, or purchased information resources themselves. Fifty-eight percent occasionally or rarely used an alternate resource when they could not obtain the information resource they needed. Visits to other

Table 6b
Alternate Methods Used to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	3(12)	12(46)	8(31)	2(8)	1(4)
borrow from colleagues	2(8)	10(38)	8(31)	3(12)	2(8)
visit other libraries	0(0)	2(8)	2(8)	7(24)	14(54)
borrow from Sci. Ed. Dept.	2(8)	8(31)	7(27)	4(15)	4(15)
borrow from other Ed. Dept.	1(4)	0(0)	6(23)	4(15)	4(15)
purchase resource	1(4)	7(27)	12(46)	2(8)	3(12)
use alternate resource	0(0)	5(19)	6(23)	9(35)	4(15)

n=26.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

libraries (81% of the students) and borrowing information resources from other College of Education departmental collections (69%) were rarely or never used to obtain resources.

Role of the University of Georgia Libraries in Providing Information Resources and Services

This study was conducted in part to determine to what extent doctoral students in science education at the University of Georgia obtain the information resources they need from the University of Georgia Main and Science Libraries and to determine what library services these students use, and if they do use them, how useful these services are to the students' doctoral work.

Question 4a. According to the students, what role did the library play in providing them with the information resources and services they needed during the coursework phase of their doctoral programs?

Three-fourths of the students extensively or frequently obtained the books, other than textbooks; periodicals; and ERIC documents they needed from the University of Georgia Libraries (see Table 4a). Dissertations and theses were obtained from the Libraries

by over one-half of the students who used them. However, nearly one-half of the students rarely or never obtained the curriculum materials written for teachers, curriculum materials written for students, audiovisual materials, instructional software, and statistical software they used from the Libraries.

Table 6a lists alternate methods the students could have used to obtained information resources they needed. None of the methods were used extensively by a majority of the students. The majority of the students frequently borrowed the information resources they needed from faculty members or colleagues when the resources were not available from the Libraries. Since the students were not asked to identify what types of resources they obtained through these alternate methods, it is not possible to tell which types of information resources were obtained through what methods.

Library Services - Coursework Phase.

Tables 7-9 list five library services offered by the University of Georgia Libraries. Students were asked to indicate whether or not they had used each of the services during the coursework phase of their doctoral program (see Part A question 6a). Subsequent questions asked the

Table 7
Use of Library Services During the Coursework and Dissertation Phases: Number and Percentage of Students Who Used Each Service

	Coursework Phase		Dissertation Phase	
	Yes	No	Yes	No
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction	9(36)	16(64)	7(28)	18(72)
library orientation	10(40)	15(60)	5(25)	20(75)
reference assistance	25(100)	0(0)	25(100)	0(0)
computer lit search	18(72)	7(28)	20(75)	5(20)
interlibrary loan	15(60)	10(40)	19(76)	6(24)

n=25.

Table 8a
Usefulness of Library Services Used During the Coursework Phase: Number and Percentage of Students Who Used Each Service and How Useful Each Service Was

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	4(44)	3(33)	2(22)	0(0)
library orientation (b)	4(40)	3(30)	3(30)	0(0)
reference assistance (c)	17(68)	7(28)	1(4)	0(0)
computer lit search (d)	9(50)	5(28)	4(22)	0(0)
interlibrary loan (e)	5(33)	4(27)	6(40)	0(0)

(a)n=9; (b)n=10; (c)n=25; (d)n=18; (e)n=15.
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 8b
Usefulness of Library Services Used During the Dissertation Phase: Number and Percentage of Students Who Used Each Service and How Useful Each Service Was

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	2(29)	4(57)	1(14)	0(0)
library orientation (b)	0(0)	3(60)	2(40)	0(0)
reference assistance (c)	17(68)	7(28)	1(4)	0(0)
computer lit search (d)	9(45)	7(35)	2(10)	2(10)
interlibrary loan (e)	5(26)	6(32)	7(37)	1(5)

(a)n=7; (b)n=5; (c)n=25; (d)n=20; (e)n=19
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 9a
Reasons for Not Using Library Services During the Coursework Phase: Number and Percentage of Students Who Did Not Use Each Service and Why

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	1(6)	3(19)	11(69)	1(6)
library orientation (b)	0(0)	5(30)	10(70)	0(0)
reference assistance (c)	0(0)	0(0)	0(0)	0(0)
computer lit search (d)	3(43)	1(14)	1(14)	2(29)
interlibrary loan (e)	0(0)	1(10)	9(90)	0(0)

(a)n=16; (b)n=15; (c)n=0; (d)n=7; (e)n=10.
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

Table 9b
Reasons for Not Using Library Services During the Dissertation Phase: Number and Percentage of Students Who Did Not Use Each Service and Why

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	0(0)	6(38)	10(62)	0(0)
library orientation (a)	1(6)	6(38)	9(56)	0(0)
reference assistance (b)	0(0)	0(0)	0(0)	0(0)
computer lit search (c)	2(40)	1(20)	1(20)	1(20)
interlibrary loan (c)	0(0)	1(20)	4(80)	0(0)

(a)n=16; (b)n=0; (c)n=5.
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

students to rate how useful the services they used were to them and to indicate why they did not use the other services listed (Part A questions 6b and 6c).

Only one-third of the students indicated that they had received library instruction during the coursework phase of their doctoral program. Three-fourths of the students who had recieved library instruction found it very useful or useful. Of the 16 students who had not recieved library instruction, two-thirds indicated that they had been aware of the service, but did not take the opportunity to use it.

Forty percent of the students had received some form of library orientation. Seventy percent of the students indicated that the library orientation was very useful or useful to them. Two-thirds of the students that did not participate in a library orientation session indicated that they had been aware of the service, but did not take the opportunity to use it.

All of the students had received reference assistance in either the Main or the Science Library. Twenty-four out of 25 of the students indicated that reference assistance had been very useful or useful to them.

Well over two-thirds of the students took advantage of the Libraries' computerized literature search services. Two-thirds of the students who had used the service found the service very useful or useful to them. Seven of the students had not used the service during the coursework phase of their doctoral programs. The majority (three) of the students who had not used the service indicated that they had been aware of the service, but did not have the funds to pay for it while they were graduate students.

Approximately two-thirds of the students tried to obtain materials the Libraries did not own through the interlibrary loan service offered by the Libraries. Sixty percent of these students found the service very useful or useful to them. Ninety percent of those who had not used the service were aware of the service, but did not take the opportunity to use it.

Question 4b. According to the students, what role did the library play in providing them with the information resources and services they needed to complete their dissertations?

Table 4b shows that at least 80% of the students extensively or frequently obtained the books, other than textbooks; periodicals; and ERIC documents they used from the University of Georgia Libraries. Over one-half of the

students who used curriculum materials written for teachers, curriculum materials written for students, audiovisual materials, instructional software, and statistical software obtained them rarely or never from the Libraries. None of the alternate methods for obtaining information resources listed in Table 6b were used extensively by a majority of the students. Over two-thirds of the students did frequently or occasionally borrow information from faculty members, or colleagues, or purchased information resources themselves. Seventy percent or more of the students rarely or never visited other libraries or borrowed resources from other College of Education departmental collections to obtain information resources not available from the Libraries. Since students were not asked to identify what types of information resources they obtained through these alternate methods, it is not possible to tell which types of information resources were obtained through what methods.

Library Services - Dissertation Phase.

Tables 7-9 list five library services offered by the University of Georgia Libraries. Students were asked to indicate whether or not they had used each of the services

during the dissertation phase of their doctoral programs (Part B, question 6a). For each of the services used the students were asked to rate how useful the service had been to them (Part B, question 6b). For those services they had not used, the students were asked to indicate why they had not used the service (Part B, question 6c).

Less than one-third of the students indicated that they had received library instruction. Six out of the seven students that received library instruction indicated that it was very useful or useful to them. Almost two-thirds of the students that did not receive library instruction indicated that they had been aware of the service, but had not taken the opportunity to use it.

Three-fourths of the students did not receive any form of library orientation. Those that participated in library orientation indicated that it was useful or somewhat useful to them. The majority of those that did not participate in library orientation indicated that they had been aware of the service, but did not take the opportunity to use it.

All of the students indicated that they had sought reference assistance from the Libraries. Twenty-four out of 25 of the students indicated that reference assistance

was either very useful or useful to them.

Three-fourths of the students did take advantage of the computerized literature search services offered by the Libraries. Three-fourths of the students who used the service indicated that it was either very useful or useful to them. Reasons for not using the service were too varied to draw any conclusions.

Three-fourths of the students indicated that they had used the Libraries' interlibrary loan service to obtain materials not owned by the Libraries. Two-thirds of these students found the service to be useful or somewhat useful. Most of the students that did not use the service indicated that they had been aware of the service, but did not take the opportunity to use it.

Differences Between the Strategies Used in the Coursework and Dissertation Phases of the Doctoral Program

This section will reexamine the data presented above to see what differences, if any, existed between the strategies used to identify and obtain information resources in the coursework and dissertation phases of the students' doctoral programs.

Question 5. Were there differences in the strategies used to identify and obtain information resources needed to complete the coursework and dissertation phases of doctoral students' programs of study?

Tables 2a and 2b indicate that both the percentage of students using and the extent to which they use computerized literature searches increased during the dissertation phase of the doctoral program. About one-half of the students used this method extensively or frequently during the dissertation phase, compared to about one-third during the coursework phase. Use of the subject card catalog, manual literature searches, reference materials, and consultations with faculty members decreased during the dissertation phase of the doctoral program.

The percentage of students using ERIC documents and statistical software extensively and frequently increased by at least ten percent during the dissertation phase (see Tables 3a and 3b). Information resources showing decreased use during the dissertation phase, both in the percentage of students who used them and the extent to which they were used, were books, other than textbooks; textbooks; curriculum materials written for students; and

popular media.

Few differences exist between the coursework and dissertation phases of the doctoral program (see Tables 4a and 4b) in the extent to which information resources were obtained from the University of Georgia Libraries. The extent to which curriculum materials written for students and for teachers were obtained from the Libraries decreased during the dissertation phase. The percentage of students who extensively or frequently obtained dissertations or theses from the Libraries increased during the dissertation phase.

The percentage of students using and the extent to which they used interlibrary loan to obtain information resources not owned by the University of Georgia Libraries increased during the dissertation phase (see Tables 5a and 5b). The rate of success for obtaining requested materials also increased during the dissertation phase.

There were few differences between the coursework and dissertation phases in the strategies used to obtain information resources not available in the Main or Science Libraries at the University of Georgia (see Tables 6a and 6b). The most noticeable difference was the extent to which information resources were obtained from the Science

Education Department collection. This shifted from occasionally or rarely during the coursework phase to frequently or occasionally during the dissertation phase.

In addition to the increase in use of computerized literature searches and interlibrary loan during the dissertation phase mentioned above, Table 7 indicates a decrease in the use of library instruction and orientation during the dissertation phase. Library orientation was judged less useful during the dissertation phase than the coursework phase by those students who had used the service (see Tables 8a and 8b). Reasons for not using the services listed in Table 7 remained the same in both phases (see tables 9a and 9b).

Library Services/Resources That Might Have Been Useful

Only those students who had completed their doctoral programs were asked to complete Part C of the questionnaire. The purpose of this part of the questionnaire was to gather data about those information services and resources that the students did not use while completing their dissertation that they now feel might have been useful.

Question 6. For students that have completed their doctoral program, were there information resources or library services they did not use, but now feel would have been beneficial to use?

Of the 22 students in the program completed group, eleven responded to question 1 in Part C of the questionnaire (see Table 10). Seven out of 11 of the students indicated that they thought they would have benefitted from using the online catalog to identify information resources. Table 11 shows that in the case of four of the students, the online catalog was not available while they were students at the University of Georgia. The online catalog was made available for public use in mid-1984 and therefore was not available for use by any of the program completed students who graduated before that time.

Differences Between the Strategies Used by the Currently Enrolled and Program Completed Students to Identify and Obtain Information Resources

This section will examine the data presented in Tables 12-27 to see if there were differences between the strategies used by students currently enrolled in the doctoral program and those who have completed the doctoral

Table 10
Library Services/Resources That Might Have Been Useful: Number and Percentage of Students Who Thought They Might Have Been Useful During the Dissertation Phase

Service/Resource	No.	%
computer lit search	3	28
reference assistance	0	0
government documents	2	18
ERIC documents	0	0
interlibrary loan	3	28
instructional software	2	18
statistical software	1	9
library instruction	0	0
library orientation	1	9
online catalog	7	67

n=11.

Table 11
Reasons for Not Using Library Services/Resources That Might Have Been Useful: Number of Students Who Thought Each Service Might Have Been Useful

Service/Resource	ANF	ANU	ANO	NAV	NA
computer lit search	0	0	1	0	1
reference assistance	0	0	0	0	0
government documents	0	1	1	0	0
ERIC documents	0	0	0	0	0
interlibrary loan	0	0	3	0	0
instructional software	0	0	0	2	0
statistical software	0	0	0	1	0
library instruction	0	0	0	0	0
library orientation	0	0	0	0	1
online catalog	0	0	1	4	1

n=10.
ANF=aware of the service/resource, but did not have the funds to pay for it
ANU=aware of the service/resource, but did not think it would provide me with any useful information
ANO=aware of the service/resource, but did not take the opportunity to use it
NAV=the service/resource was not available while I was a graduate student at the University of Georgia
NA=not aware of the service at the time

program to identify and obtain information resources during the coursework and dissertation phases of their doctoral programs. Comparisons between the two groups of students for the dissertation phase was not possible in some cases due to the low number of responses from currently enrolled students in the dissertation phase of their doctoral programs.

Question 7. What differences, if any, exist between the strategies used to identify and obtain information resources of students currently enrolled in the doctoral program and those who have graduated?

The currently enrolled students and the program completed students both relied most heavily on manual literature searches, manual searches of journals, and citations from other sources to identify the information resources needed to complete their course assignments (see Tables 12a and 12b). More of the program completed students consulted with colleagues and used computerized literature searches and reference materials than currently enrolled students; they used these methods more extensively than the currently enrolled students. Use of the online catalog was more frequent among the currently enrolled students than the program completed students.

Table 12a
Methods Used by Currently Enrolled Students to Identify Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	1(13)	1(13)	3(37)	2(25)	1(13)
manual lit search	1(13)	5(62)	1(13)	1(13)	0(0)
manual search of journals	2(25)	6(75)	0(0)	0(0)	0(0)
subject card catalog	0(0)	1(13)	2(25)	4(50)	1(13)
online catalog	1(13)	3(37)	1(13)	2(25)	1(13)
citations from other sources	3(37)	3(37)	2(25)	0(0)	0(0)
consulted faculty	0(0)	3(37)	3(37)	2(25)	0(0)
consulted colleagues	0(0)	3(37)	2(25)	3(37)	0(0)
reference materials	0(0)	3(37)	1(13)	3(37)	1(13)

n=8.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 12b
Methods Used by Program Completed Students to Identify Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	2(9)	7(23)	3(14)	7(32)	3(14)
manual lit search	2(9)	13(59)	6(28)	1(5)	0(0)
manual search of journals	6(28)	10(45)	4(18)	2(9)	0(0)
subject card catalog	2(9)	3(14)	10(45)	6(28)	1(5)
online catalog	2(9)	6(28)	1(5)	5(23)	7(32)
citations from other sources	8(36)	8(36)	4(18)	2(9)	0(0)
consulted faculty	3(14)	11(50)	7(32)	1(5)	0(0)
consulted colleagues	3(14)	9(41)	8(36)	2(9)	0(0)
reference materials	1(5)	11(50)	7(32)	2(9)	1(5)

n=22.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

This is not surprizing, since the online catalog was not available for use by the program completed students who had graduated before Summer Quarter 1984. The same differences in strategies used by the two groups to identify information resources were found for the dissertation phase (see Tables 13a and 13b).

Program completed students used curriculum materials written for teachers, curriculum materials written for students, dissertations and theses, and popular media less extensively than currently enrolled students during the coursework phase of their doctoral programs (see Tables 14a and 14b). However, the program completed students used periodicals and statistical software more extensively than currently enrolled students. The data presented in Tables 15a and 15b indicate less use of textbooks by currently enrolled students as compared to program completed students during the dissertation phase of their doctoral programs. These data are insufficient to draw any other conclusions from this table.

As seen in Tables 16a and 16b, during the coursework phase, program completed students obtained the books, other than textbooks; government documents; and dissertations and theses they used more extensively from

Table 13a
Methods Used by Currently Enrolled Students to Identify Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	0(0)	1(33)	2(67)	0(0)	0(0)
manual lit search	1(33)	0(0)	2(67)	0(0)	0(0)
manual search of journals	3(100)	0(0)	0(0)	0(0)	0(0)
subject card catalog	1(33)	0(0)	1(33)	1(33)	0(0)
online catalog	0(0)	2(67)	1(33)	0(0)	0(0)
citations from other sources	2(67)	0(0)	1(33)	0(0)	0(0)
consulted faculty	1(33)	1(33)	0(0)	1(33)	0(0)
consulted colleagues	1(33)	1(33)	1(33)	0(0)	0(0)
reference materials	0(0)	0(0)	1(33)	0(0)	2(67)

n=3.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 13b
Methods Used by Program Completed Students to Identify Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
computer lit search	7(32)	6(28)	4(18)	4(18)	1(5)
manual lit search	13(59)	7(32)	2(9)	0(0)	0(0)
manual search of journals	13(59)	7(32)	2(9)	0(0)	0(0)
subject card catalog	2(9)	3(14)	10(45)	6(28)	1(5)
online catalog	2(9)	6(28)	3(14)	5(23)	5(23)
citations from other sources	11(50)	7(32)	4(18)	0(0)	0(0)
consulted faculty	4(18)	8(38)	8(36)	2(9)	0(0)
consulted colleagues	4(18)	7(32)	9(41)	2(9)	0(0)
reference materials	4(18)	7(32)	7(32)	4(18)	0(0)

n=22.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 14a
Information Resources Used by Currently Enrolled Students During the Coursework Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E	F	O	R	N
Resource Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks	1(17)	3(50)	2(33)	0(0)	0(0)
textbooks	3(50)	3(50)	0(0)	0(0)	0(0)
periodicals	1(17)	4(66)	1(17)	0(0)	0(0)
curriculum mat. for teachers	1(17)	2(33)	2(33)	0(0)	1(17)
curriculum mat. for students	0(0)	1(17)	4(66)	0(0)	1(17)
audiovisual materials	0(0)	1(17)	0(0)	2(33)	3(50)
instructional software	0(0)	0(0)	1(17)	3(50)	2(33)
statistical software	0(0)	2(33)	0(0)	2(33)	2(33)
ERIC documents	0(0)	3(50)	2(33)	1(17)	0(0)
government documents	0(0)	0(0)	0(0)	1(17)	5(83)
dissertations & theses	0(0)	1(17)	5(83)	0(0)	0(0)
popular media	0(0)	1(17)	0(0)	4(66)	1(17)
reference materials	1(17)	2(33)	1(17)	1(17)	1(17)

n=6.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 14b
Information Resources Used by Program Completed Students During the Coursework Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E	F	O	R	N
Resource Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks	4(29)	13(65)	1(15)	1(15)	1(15)
textbooks	2(10)	12(60)	3(15)	2(10)	0(0)
periodicals	11(55)	7(35)	1(5)	0(0)	0(0)
curriculum mat. for teachers	1(5)	2(10)	8(40)	7(35)	1(5)
curriculum mat. for students	0(0)	2(10)	9(45)	6(30)	2(10)
audiovisual materials	0(0)	0(0)	5(25)	12(60)	2(10)
instructional software	0(0)	1(5)	6(30)	7(35)	4(20)
statistical software	2(10)	10(50)	6(30)	1(5)	0(0)
ERIC documents	4(20)	7(35)	7(35)	0(0)	1(5)
government documents	0(0)	1(5)	6(30)	3(15)	9(45)
dissertations & theses	1(5)	1(5)	10(50)	7(35)	0(0)
popular media	0(0)	0(0)	8(40)	9(45)	2(10)
reference materials	1(5)	10(50)	6(30)	2(10)	0(0)

n=20.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 15a
Information Resources Used by Currently Enrolled Students During the Dissertation Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E		F		O		R		N	
Resource Used	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
books, other than textbooks	1	(33)	2	(67)	0	(0)	0	(0)	0	(0)
textbooks	0	(0)	0	(0)	2	(67)	0	(0)	1	(33)
periodicals	3	(100)	0	(0)	0	(0)	0	(0)	0	(0)
curriculum mat. for teachers	0	(0)	0	(0)	1	(33)	0	(0)	2	(67)
curriculum mat. for students	0	(0)	0	(0)	3	(100)	0	(0)	0	(0)
audiovisual materials	0	(0)	0	(0)	0	(0)	1	(33)	2	(67)
instructional software	0	(0)	0	(0)	0	(0)	0	(0)	3	(100)
statistical software	1	(33)	1	(33)	1	(33)	0	(0)	0	(0)
ERIC documents	0	(0)	1	(33)	0	(0)	2	(67)	0	(0)
government documents	0	(0)	0	(0)	0	(0)	1	(33)	2	(67)
dissertations & theses	0	(0)	1	(33)	2	(67)	0	(0)	0	(0)
popular media	0	(0)	0	(0)	0	(0)	0	(0)	3	(100)
reference materials	0	(0)	1	(33)	0	(0)	0	(0)	2	(67)

n=3.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 15b
Information Resources Used by Program Completed Students During the Dissertation Phase: Number and Percentage of Students Who Used Each Resource and to What Extent

	E	F	O	R	N
Resource Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks	5(23)	7(32)	9(41)	0(0)	1(5)
textbooks	0(0)	6(27)	9(41)	6(27)	1(5)
periodicals	20(91)	2(9)	0(0)	0(0)	0(0)
curriculum mat. for teachers	1(5)	4(18)	7(32)	8(36)	2(9)
curriculum mat. for students	0(0)	3(14)	5(23)	5(23)	9(41)
audiovisual materials	2(9)	0(0)	3(14)	4(18)	13(59)
instructional software	1(5)	5(23)	2(9)	6(27)	7(32)
statistical software	16(73)	4(18)	0(0)	1(5)	1(5)
ERIC documents	7(32)	11(50)	4(18)	1(5)	0(0)
government documents	0(0)	2(9)	7(32)	6(27)	7(32)
dissertations & theses	4(18)	8(36)	10(45)	0(0)	0(0)
popular media	0(0)	3(14)	4(18)	6(27)	9(41)
reference materials	3(14)	5(23)	7(32)	6(27)	1(5)

n=22.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 16a
Extent to Which Information Resources Were Obtained from the UGA Libraries by Currently Enrolled Students During the Coursework Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	0(0)	3(60)	1(20)	1(20)	0(0)
textbooks (b)	0(0)	1(25)	1(25)	1(25)	1(25)
periodicals (a)	2(40)	1(20)	2(40)	0(0)	0(0)
curriculum mat. for teachers (b)	0(0)	2(50)	1(25)	0(0)	1(25)
curriculum mat. for students (b)	0(0)	1(25)	2(50)	0(0)	1(25)
audiovisual materials (c)	0(0)	0(0)	1(33)	0(0)	2(67)
instructional software (b)	0(0)	0(0)	0(0)	0(0)	3(100)
statistical software (b)	1(25)	0(0)	0(0)	0(0)	3(75)
ERIC documents (b)	1(25)	2(50)	1(25)	0(0)	0(0)
government documents (d)	0(0)	0(0)	1(50)	0(0)	1(50)
dissertations & theses (b)	0(0)	1(25)	2(50)	0(0)	1(25)
popular media (b)	1(25)	1(25)	1(25)	1(25)	0(0)
reference materials* (b)	1(25)	1(25)	1(25)	1(25)	0(0)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=5; (b)n=4; (c)n=3; (c)n=2.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 16b
Extent to Which Information Resources Were Obtained from the UGA Libraries by Program Completed Students During the Coursework Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	7(37)	8(42)	2(11)	2(11)	0(0)
textbooks (b)	2(13)	1(6)	5(31)	4(25)	4(25)
periodicals (a)	15(79)	3(16)	1(5)	0(0)	0(0)
curriculum mat. for teachers (a)	2(11)	3(16)	4(21)	7(37)	3(16)
curriculum mat. for students (a)	1(6)	3(16)	5(26)	5(26)	5(26)
audiovisual materials (c)	1(6)	1(6)	4(22)	8(44)	4(22)
instructional software (d)	1(7)	1(7)	4(27)	4(27)	5(33)
statistical software (c)	3(17)	3(17)	3(17)	2(11)	7(39)
ERIC documents (c)	10(56)	7(39)	1(6)	0(0)	0(0)
government documents (e)	5(36)	2(14)	4(29)	1(7)	2(14)
dissertations & theses (a)	5(26)	5(26)	4(21)	3(16)	2(11)
popular media (d)	5(33)	1(7)	4(27)	4(27)	1(7)
reference materials* (a)	8(42)	7(37)	3(16)	1(5)	0(0)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=19; (b)n=16; (c)n=18; (d)n=15; (e)n=14.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

the University of Georgia Libraries than did the currently enrolled students. Program completed students obtained the curriculum materials written for teachers and for students and the popular media they used less extensively from the Libraries than did the currently enrolled students during this phase. Sufficient data were not gathered from the currently enrolled students in the dissertion phase of their programs to make any comparisons (see Tables 17a and 17b). The only student (out of the four respondents) in the category who answered question 3 of Part A commented that he or she lived in Atlanta and had used the libary at Georgia State University extensively.

During both the coursework (see Tables 18a and 18b) and dissertation (see Tables 19a and 19b) phases the students who had completed the program made much more extensive use of the interlibrary loan service to obtain items not owned by the Libraries than did those currently enrolled in the program.

When an information resource was not available from the University of Georgia Libraries, the program completed students borrowed materials from the Science Education Department collection or purchased the resource themselves

Table 17a
Extent to Which Information Resources Were Obtained from the UGA Libraries by Currently Enrolled Students During the Dissertation Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	0(0)	0(0)	0(0)	0(0)	0(0)
textbooks (a)	0(0)	0(0)	0(0)	0(0)	0(0)
periodicals (b)	0(0)	0(0)	0(0)	0(0)	1(100)
curriculum mat. for teachers (b)	0(0)	0(0)	0(0)	0(0)	1(100)
curriculum mat. for students (b)	0(0)	0(0)	0(0)	0(0)	1(100)
audiovisual materials (b)	0(0)	0(0)	0(0)	0(0)	1(100)
instructional software (b)	0(0)	0(0)	0(0)	0(0)	1(100)
statistical software (b)	0(0)	0(0)	0(0)	0(0)	1(100)
ERIC documents (b)	0(0)	0(0)	0(0)	0(0)	1(100)
government documents	0(0)	0(0)	0(0)	0(0)	1(100)
dissertations & theses (b)	0(0)	0(0)	0(0)	0(0)	1(100)
popular media (b)	0(0)	0(0)	0(0)	0(0)	1(100)
reference materials* (b)	0(0)	0(0)	0(0)	0(0)	1(100)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=0; (b)n=1.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 17b
Extent to Which Information Resources Were Obtained from the UGA Libraries by Program Completed Students During the Dissertation Phase: Number and Percentage of Students Who Obtained Each Resource and to What Extent

	E	F	O	R	N
Resource Obtained	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
books, other than textbooks (a)	8(42)	8(42)	1(5)	2(11)	0(0)
textbooks (b)	2(13)	0(0)	6(40)	5(33)	2(13)
periodicals (a)	15(79)	4(21)	0(0)	0(0)	0(0)
curriculum mat. for teachers (c)	4(22)	2(11)	3(17)	4(22)	5(28)
curriculum mat. for students (d)	3(21)	1(7)	2(14)	3(21)	5(36)
audiovisual materials (e)	1(10)	0(0)	2(20)	2(20)	5(50)
instructional software (f)	2(17)	1(8)	3(25)	1(8)	5(42)
statistical software (c)	7(39)	2(11)	1(6)	3(17)	5(28)
ERIC documents (c)	13(72)	3(17)	1(6)	1(6)	0(0)
government documents (d)	6(43)	3(21)	3(21)	1(7)	1(7)
dissertations & theses (c)	9(50)	4(22)	4(22)	1(6)	0(0)
popular media (f)	4(33)	1(8)	4(33)	3(25)	0(0)
reference materials* (a)	10(53)	6(32)	2(11)	1(5)	0(0)

*Note. These materials were defined as being located in the UGA Libraries.
(a)n=19; (b)n=15; (c)n=18; (d)n=14; (e)n=10; (f)n=12.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 18a
Use of Interlibrary Loan (ILL) by Currently Enrolled Students to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	0(0)	1(13)	0(0)	1(13)	6(75)
extent of success (b)	0(0)	1(100)	0(0)	0(0)	0(0)

(a)n=8; (b)n=1.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 18b
Use of Interlibrary Loan (ILL) by Program Completed Students to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	0(0)	4(18)	6(27)	7(34)	5(23)
extent of success (b)	4(24)	6(35)	4(24)	0(0)	1(6)

(a)n=22; (b)n=17.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 19a
Use of Interlibrary Loan (ILL) by Currently Enrolled Students to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	0(0)	0(0)	1(50)	0(0)	1(50)
extent of success (b)	0(0)	1(100)	0(0)	0(0)	0(0)

(a)n=2; (b)n=1.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 19b
Use of Interlibrary Loan (ILL) by Program Completed Students to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used ILL, to What Extent, and Extent of Success

	E	F	O	R	N
Use of ILL	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
extent of use (a)	3(16)	6(32)	5(26)	3(16)	2(11)
extent of success (b)	5(29)	7(42)	3(18)	1(6)	1(6)

(a)n=19; (b)n=17.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

more extensively than did the currently enrolled students during the coursework (see Tables 20a and 20b) and the dissertation (see Tables 21a and 21b) phase. The program completed students borrowed materials from colleagues slightly less frequently than did currently enrolled students during the coursework phase.

The same percentages of the currently enrolled students and program completed students used the computerized literature search service offered by the Libraries during the coursework (see Table 22) and dissertation (see Table 23) phases. Most of the students from both groups who had the used the service found it useful or very useful. Answers from those who had not used the service varied between the two groups as to why they did not use the service (see Tables 24a, 24b, 25a and 25b). Currently enrolled students were aware of the service, but did not take the opportunity to use the service (see Tables 26a and 27a). Program completed students often cited the lack of funds as the reason for not using the service (see Tables 26b and 27b).

Table 20a
Alternate Methods Used by Currently Enrolled Students to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	0(0)	4(50)	4(50)	0(0)	0(0)
borrow from colleagues	0(0)	3(37)	4(50)	1(13)	0(0)
visit other libraries	1(13)	0(0)	1(13)	3(37)	3(37)
borrow from Sci. Ed. Dept.	0(0)	2(25)	1(13)	5(62)	0(0)
borrow from other Ed. Dept.	0(0)	0(0)	0(0)	2(25)	6(75)
purchase resource	0(0)	1(13)	3(37)	1(13)	3(37)
use alternate resource	0(0)	1(13)	2(25)	2(25)	3(37)

n=8.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 20b
Alternate Methods Used by Program Completed Students to Obtain Information Resources During the Coursework Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	1(5)	5(10)	10(48)	7(33)	0(0)
borrow from colleagues	1(5)	8(38)	3(14)	9(43)	0(0)
visit other libraries	0(0)	0(0)	3(14)	7(33)	11(52)
borrow from Sci. Ed. Dept.	3(14)	5(24)	7(33)	4(19)	2(10)
borrow from other Ed. Dept.	1(5)	1(5)	4(19)	6(29)	9(43)
purchase resource	1(5)	7(33)	8(38)	4(19)	1(5)
use alternate resource	0(0)	4(19)	6(29)	6(29)	5(24)

n=21.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 21a
Alternate Methods Used by Currently Enrolled Students to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	0(0)	2(67)	0(0)	0(0)	1(33)
borrow from colleagues	0(0)	2(67)	0(0)	0(0)	1(33)
visit other libraries	0(0)	0(0)	0(0)	1(33)	2(67)
borrow from Sci. Ed. Dept.	0(0)	0(0)	1(33)	0(0)	2(67)
borrow from other Ed. Dept.	0(0)	0(0)	0(0)	0(0)	3(100)
purchase resource	0(0)	1(33)	1(33)	0(0)	1(33)
use alternate resource	0(0)	0(0)	1(33)	1(33)	1(33)

n=3.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 21b
Alternate Methods Used by Program Completed Students to Obtain Information Resources During the Dissertation Phase: Number and Percentage of Students Who Used Each Method and to What Extent

	E	F	O	R	N
Method Used	No.(%)	No.(%)	No.(%)	No.(%)	No.(%)
borrow from faculty	3(14)	9(41)	8(36)	2(9)	0(0)
borrow from colleagues	2(9)	8(36)	8(36)	3(14)	1(5)
visit other libraries	0(0)	2(9)	2(9)	6(27)	12(55)
borrow from Sci. Ed. Dept.	2(9)	8(36)	6(27)	4(18)	2(9)
borrow from other Ed. Dept.	1(5)	0(0)	6(27)	4(18)	11(50)
purchase resource	1(5)	6(27)	11(50)	2(9)	2(9)
use alternate resource	0(0)	5(23)	5(23)	8(36)	3(14)

n=22.
E=extensively; F=frequently; O=occasionally; R=rarely; N=never

Table 22
Use of Library Services During the Coursework Phase: Number and Percentage of Students Who Used Each Service

	Currently Enrolled (a)		Program Completed (b)	
	Yes	No	Yes	No
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction	2(33)	4(67)	6(32)	13(68)
library orientation	2(33)	4(67)	8(42)	11(58)
reference assistance	6(100)	0(0)	19(100)	0(0)
computer lit search	4(67)	2(33)	14(74)	5(26)
interlibrary loan	1(17)	5(83)	14(74)	5(26)

(a)n=6; (b)n=19.

Table 23
Use of Library Services During the Dissertation Phase: Number and Percentage of Students Who Used Each Service

	Currently Enrolled (a)		Program Completed (b)	
	Yes	No	Yes	No
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction	1(33)	2(67)	6(27)	16(73)
library orientation	0(0)	3(100)	5(23)	17(77)
reference assistance	3(100)	0(0)	22(100)	0(0)
computer lit search	2(67)	1(33)	18(82)	4(18)
interlibrary loan	1(33)	2(67)	18(82)	4(18)

(a)n=3; (b)n=22.

Table 24a
Usefulness of Library Services Used by Currently Enrolled Students During the Coursework Phase: Number and Percentage of Students Who Used Each Service and Extent of Usefulness

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	2(100)	0(0)	0(0)	0(0)
library orientation (a)	2(100)	0(0)	0(0)	0(0)
reference assistance (b)	5(83)	0(0)	1(17)	0(0)
computer lit search (c)	2(50)	0(0)	2(50)	0(0)
interlibrary loan (d)	1(100)	0(0)	0(0)	0(0)

(a)n=2; (b)n=6; (c)n=4; (d)n=1.
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 24b
Usefulness of Library Services Used by Program Completed Students During the Coursework Phase: Number and Percentage of Students Who Used Each Service and Extent of Usefulness

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	2(25)	3(37)	2(25)	1(13)
library orientation (b)	2(20)	3(30)	3(30)	2(20)
reference assistance (c)	12(63)	7(37)	0(0)	0(0)
computer lit search (d)	7(50)	5(36)	2(14)	0(0)
interlibrary loan (d)	4(29)	4(29)	6(43)	0(0)

(a)n=8; (b)n=10; (c)n=19; (d)n=14.
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 25a
Usefulness of Library Services Used by Currently Enrolled Students During the Dissertation Phase: Number and Percentage of Students Who Used Each Service and Extent of Usefulness

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	1(100)	0(0)	0(0)	0(0)
library orientation (b)	0(0)	0(0)	0(0)	0(0)
reference assistance (c)	3(100)	0(0)	0(0)	0(0)
computer lit search (d)	0(0)	1(50)	0(0)	1(50)
interlibrary loan (a)	0(0)	1(100)	0(0)	0(0)

(a)n=1; (b)n=0; (c)n=3; (d)n=2.
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 25b
Usefulness of Library Services Used by Program Completed Students During the Dissertation Phase: Number and Percentage of Students Who Used Each Service and Extent of Usefulness

	VU	U	SU	NU
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	1(11)	4(44)	1(11)	3(33)
library orientation (b)	0(0)	3(37)	2(25)	3(37)
reference assistance (c)	14(64)	7(32)	1(4)	0(0)
computer lit search (d)	9(50)	6(33)	2(11)	1(5)
interlibrary loan (d)	5(28)	5(28)	7(39)	1(5)

(a)n=9; (b)n=8; (c)n=22; (d)n=18.
VU=very useful; U=useful; SU=somewhat useful; NU=not useful

Table 26a
Reasons Cited by Currently Enrolled Students for Not Using Library Services During the Coursework Phase: Number and Percentage of Students

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	0(0)	1(33)	2(67)	0(0)
library orientation (b)	0(0)	1(25)	3(75)	0(0)
reference assistance (c)	0(0)	0(0)	0(0)	0(0)
computer lit search (d)	0(0)	0(0)	1(50)	1(50)
interlibrary loan (e)	0(0)	0(0)	5(100)	0(0)

(a)n=3; (b)n=4; (c)n=0; (d)n=2; (e)n=5.
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

Table 26b
Reasons Cited by Program Completed Students for Not Using Library Services During the Coursework Phase: Number and Percentage of Students

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	1(8)	2(15)	9(69)	1(8)
library orientation (b)	0(0)	4(36)	7(64)	0(0)
reference assistance (c)	0(0)	0(0)	0(0)	0(0)
computer lit search (d)	3(50)	1(17)	1(17)	1(17)
interlibrary loan (e)	0(0)	1(20)	4(80)	0(0)

(a)n=13; (b)n=11; (c)n=0; (d)n=6; (e)n=5
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

Table 27a
Reasons Cited by Currently Enrolled Students for Not Using Library Services During the Dissertation Phase: Number and Percentage of Students

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	0(0)	1(50)	1(50)	0(0)
library orientation (a)	0(0)	1(50)	1(50)	0(0)
reference assistance (b)	0(0)	0(0)	0(0)	0(0)
computer lit search (c)	0(0)	0(0)	1(100)	0(0)
interlibrary loan (c)	0(0)	0(0)	1(100)	0(0)

(a)n=2; (b)n=0; (c)n=1.
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

Table 27b
Reasons Cited by Program Completed Students for Not Using Library Services During the Dissertation Phase: Number and Percentage of Students

	ANF	ANU	ANO	NA
Library Service	No.(%)	No.(%)	No.(%)	No.(%)
library instruction (a)	0(0)	5(36)	9(64)	0(0)
library orientation (a)	1(7)	5(36)	8(57)	0(0)
reference assistance (b)	0(0)	0(0)	0(0)	0(0)
computer lit search (c)	2(40)	1(20)	1(20)	1(20)
interlibrary loan (d)	0(0)	1(25)	3(75)	0(0)

(a)n=14; (b)n=0; (c)n=5; (d)n=4.
ANF=aware of the service, but did not have the funds to pay for it
ANU=aware of the service, but did not think it would provide me with any useful information
ANO=aware of the service, but did not take the opportunity to use it
NA=not aware of the service at the time

Summary

The results of this study revealed that doctoral students in science education at the University of Georgia used manual literature searches, manual searches of journals, and citations from other sources more frequently and extensively than other methods to identify the information resources they needed to complete their course assignments and dissertations. During the coursework phase the students used periodicals, books, and textbooks more frequently and extensively than other information resources. The information resources used most extensively during the dissertation phase were periodicals. statistical software, and ERIC documents. During both phases the students obtained print information resources, such as periodicals, books, and ERIC documents from the University of Georgia Libraries. Non-print information resources, such as audiovisual materials, statistical and instructional software, and curriculum materials written for teachers and students were rarely or never obtained from the Libraries. Use of interlibrary loan and computerized literature searches increased during the dissertation phase; the students also rated these services more useful to them during the dissertation

phase. Less than half of the students received library instruction and orientation during either phase of their doctoral programs. To obtain information resources the Libraries did not own, the students most extensively borrowed resources from faculty and colleagues. Visiting other libraries was rarely or never used by most of the students in the program. Students who had completed the program thought that the online catalog would have been useful in identifying information resources while doing their dissertation. The online catalog was not available when many of the program completed students were in graduate school.

Chapter 5

Discussion and Conclusions

This Chapter includes a summary of the study, a discussion of the results, conclusions, and implications and recommendations for further study.

Summary of Study

The purpose of this study was to investigate the role of the library in providing information needed by doctoral students in science education at the University of Georgia. Questionnaires (see Appendix A) were distributed to 52 doctoral students who were currently enrolled in or recently graduated from the doctoral program (Ed.D. and Ph.D. students.) Completed questionnaires were received from eight students who were currently enrolled in the program and 22 students who had graduated from the program. Responses were tabulated and analysed to determine the use of information resources and library services during the coursework and dissertation phases of the doctoral program. Comparisons were made between information resources and library services used in coursework and dissertation phases, and between the information resources and library services

used by students currently enrolled in and recently graduated from the program.

Discussion of Results

The majority of the students involved in the study relied most extensively on manual literature searches, manual searches of journals, and citations from other sources to identify information resources they needed to complete their course assignments. These methodologies were carried over to the dissertation phase when identifying needed information resources, presumably because they had been effective, but maybe because they were the only methods the students were familiar with. While the use of computerized literature searching increased during the dissertation phase among both the currently enrolled and the program completed students, it was not used extensively by most of the students. The education faculty studied by Gleaves, Scepanski, and Mazini (1984) also used these methods to identify information resources.

The University of Georgia Libraries began offering the librarian-mediated computerized literature search service during the Spring Quarter of 1979 (J. Campbell, personal communication, May 18, 1989). The Libraries instituted an

end-user search service named SHERLOCK (BRS After Dark) in 1987. This service offered users the option of performing their own online searches in the evenings or on the weekends at a reduced price. The lack of use of these two services was somewhat surprizing. Computerized literature searching is a method that can retrieve a list of citations quickly and easily by combining keywords and concepts that might not normally appear together. Most of the students who did not use the computerized literature search service while graduate students cited a lack of funds to pay for the service as the reason they did not use the service. Lack of funds may have also prevented students from making more frequent use of these services. During the Fall Quarter of 1988 the Reference Department of the University of Georgia Main Library installed ERIC on CD-Rom for public use. This new product would have had little impact on the students involved in this study since most of them had graduated from the program before it was available. However, ERIC on CD-Rom is bound to have an impact on the methods used by currently enrolled students and future students in the doctoral program to identify information resources, because it is faster and easier than manual searching and is available at no cost to the user. An increase in the use of

computerized literature searches by currently enrolled students to identify information resources may be due to the installation of the SHERLOCK service or ERIC on CD-Rom making these methods more accessible to the students. The librarians in the Reference Department have noticed a decline in the number of ERIC searches run on the SHERLOCK system and the librarian mediated system, though to date they have not collected data on the extent of that decline (J. Campbell, personal communication, May 18, 1989). The number of students who use computerized literature searches and the frequency with which they use them will increase now that the ERIC database is available to them free of charge.

Unlike the graduate students involved in the study conducted by Farid, Snyder, and Palmquist (1984), in which the card catalog and the online catalog available at the Syracuse University Libraries were the most frequently used tools to identify information resources, doctoral students in science education made only occasional or rare use of their counterparts in the University of Georgia Libraries. Several factors may have influenced this:

1. The students relied on periodicals during both phases and on ERIC documents during the dissertation phase as their principal information resources. The contents of these

resouces cannot be identified using the subject card catalog or online catalog at the University of Georgia.

2. The online catalog was not available while many of these students were enrolled in the doctoral program. The online catalog became available for public use in 1984 and this study included students who graduated from the program before 1984.

3. Only a portion of the Libraries' holdings were retrievable through the online catalog when it was first initiated. At first only those materials added to the Libraries' collections since 1980, and a portion of those materials added in 1978 and 1979, were retrievable using the online catalog. Through an on-going retrospective conversion project, the rest of the Libraries' holdings are being added to the database.

4. Subject searching capability on the online catalog was not available for most of the Libraries' holdings for the first three years of public access. Therefore, it was not possible to do a complete search for books on a topic using subject headings. The online catalog offers keyword access, but the success of this approach varies with the discipline.

The online catalog does have the advantage of including materials on order and in processing for the Libraries, information that was not available to users before the online catalog was developed. Several of the students, who had completed the program and not used the online catalog while they were students, thought that the online catalog might have been useful to them while completing their dissertation. As the search features for it are modified and holdings are added to it through on-going projects the online catalog's usefulness to students should increase, and therefore its use by the students.

The students used books, other than textbooks; periodicals; and textbooks to complete their course assignments, but periodicals and ERIC documents on microfiche to complete their dissertations. In contrast, the education faculty studied by Gleaves Scepanski, and Mazini (1984) primarily used books and periodicals for their research.

Doctoral students in science education seem to rely on the University of Georgia Libraries for the print information resources, such as books, periodicals, and ERIC documents, that they needed to complete their dissertations and course assignments. Visits to other libraries were made

rarely or never by most of the students. However, the students must have used other methods to obtain the audiovisual materials, statistical and instructional software, and curriculum materials they needed during their doctoral programs, since these materials were rarely or never obtained from the Libraries by most of the students. Data were not gathered on what methods they might have used to obtain these information resources.

At least two-thirds of the students used the interlibrary loan service at some time to obtain materials not owned by the Libraries during both phases of their doctoral programs. The students frequently borrowed resources not available in the Libraries from faculty or colleagues. Students also borrowed materials from the Science Education Departmental collection or purchased the resource themselves. Data were not gathered as to what kinds of materials they obtained through these methods. It is possible that they obtained materials, such as audiovisual materials, software, and curriculum materials through the latter four of these methods, since they did not obtain these materials from the Libraries.

Alire's (1984) nationwide study of doctoral students in education indicated that doctoral students felt their

library skills were deficient and they they needed instruction in library research methodology. O'Hanlon (1987 and 1988) wrote two papers in support of library instruction for undergraduate education majors. Yet only about one-third of the students involved in this study participated in library instruction or library orientation. Most of those that did participate thought the experience had been useful to them. Library orientation sessions are offered on a walk-in basis by the Reference Departments of the Libraries, especially during the Fall Quarter. Library instruction usually occurs as part of a class at the request of the instructor. From the data gathered it would seem that about two-thirds of the students did not receive library instruction through any of their courses. Most of the students who did not participate in library orientation or instruction indicated that they had been aware of these services, but did not take the opportunity to use them.

All students had sought reference assistance from the Libraries during both phases of their doctoral programs. Most of the students felt that reference assistance was useful or very useful to them. The students did not seem hesitant to ask for help in identifying or locating information resources in the Libraries.

Conclusions

1. Doctoral students in science education at the University of Georgia relied primarily on manual searches of indexes and abstracts and manual searches of journals, as well as citations from other sources, to identify the information resources they needed to complete their course assignments. The students used these same methods to identify the information resources they needed to complete their dissertations.

2. These students extensively used traditional print materials such as books, other than textbooks; periodicals; and textbooks to complete their course assignments. During the dissertation phase more extensive use was made of periodicals, ERIC documents, and statistical software to complete dissertations.

3. Traditional print formats such as books, periodicals, and ERIC documents were obtained from the Libraries during both phases of the doctoral program. None of the alternate methods were used extensively. The alternate methods most frequently used to obtain materials not owned by the Libraries was to borrow them from faculty or colleagues.

4. Students relied on the University of Georgia Libraries to supply them with most of their information needs during both the coursework and dissertion phases. Visits to other libraries to obtain resources were rare and none of the other alternate methods of obtaining information resources was used extensively. Students made extensive use of reference assistance, moderate use of the Libraries' interlibrary loan and computerized literature search services, and infrequent use of the Libraries' orientation and instruction services.

5. Few differences existed between the coursework and dissertation phases in the strategies used to identify and obtain information. Methods employed during the coursework phase seemed to have been carried over to the dissertation phase.

6. Students who have completed the program thought that the online catalog would have been useful to them in identifying information resources for their dissertations. For most of these students the online catalog was not available while they were graduate students.

7. Few differences existed in the strategies used by currently enrolled and program completed students in identifying and locating the information resources they needed to complete their course assignments and dissertations. The increase in the use of the online catalog and computerized literature searches by currently enrolled students may reflect their greater access to these new and expanding technologies within the Libraries.

The University of Georgia Libraries played a prominent role in providing the information needed by doctoral students in science education to complete their course assignments and their dissertations. The methods used to identify information resources and the information resources used most frequently were available in the Libraries. Students extensively obtained information resources they used most extensively from the Libraries. These students did not often use other libraries to get the resources they needed, nor did they make extensive use of interlibrary loan or other alternate methods to obtain information resources the Libraries could not supply. They also sought assistance from the reference desks in the Libraries as they needed it.

Further Study

The following are recommendations for further study:

1. The present study did not measure the students' satisfaction with the Libraries. A subsequent study should be designed to determine if there were information resources or library services the students thought the library should have supplied or if there are improvements in the Libraries' services or holdings these students think should be made. The study could also ask the students to rate the effectiveness of the information resource identifying strategies the students used and find out how they learned to identify information resources.

2. The present study did not attempt to determine where the students obtained the information resources they obtained rarely or never from the Libraries nor to match up which types of information resources they obtained through the alternate methods specified in the questionnaire. A subsequent study should be designed to answer these questions.

3. A subsequent study should also be designed to determine if the methods used to identify information resources and the information resources used during graduate school are still used when they seek information relative to their current research interests and teaching assignments. In such a study students would be asked about their present positions, what information resources identifying methods and what information resources they are presently using and did use as graduate students, and compare the strategies used as educators with those used as students to see if they vary with the position held.

4. The Libraries now offer ERIC, Disseration Abstracts International, and Psychological Abstracts on CD-Rom; and the number of indexes and abstracts available on CD-Rom is expected to increase. The Libraries' online catalog is undergoing modifications to make it easier to use and to eventually include all of the Libraries' holdings. Both of these new technologies will affect on how students locate and obtain the information they need to complete their programs of study. A subsequent study should be designed to determine the effect these new technologies have and will have on present and future science education doctoral students at the University of Georgia.

5. A fifth subsequent study should be made of the need for, and feasibility of a five quarter hour library instruction course for beginning graduate students at the University of Georgia. The study would include a survey of colleges and universities that currently support similar programs to determine their programs' extent of success, how the programs are administered, the resources needed to conduct the programs, and the teaching methods used and information covered in the programs. The study should also address the following questions: (a) Is there a need for this type of program at the University of Georgia? (b) How will the University of Georgia administer this program? Who would be responsible for its development and content? (c) Are there sufficient resources are currently available at the University of Georgia to support the program? If so, what and where are they? If not, can missing resources be obtained? (d) Is there sufficient support from University Faculty and Administration to make such a program work? (e) What are the expectations of the program on the part of librarians, faculty, students, and administrators?

6. Finally, a study should be made that includes doctoral students in other education disciplines, both currently enrolled in and graduated from the University of Georgia. Information resource identifying strategies and information resources used would be compared across disciplines to see if they vary with the discipline. Numbers might then be sufficient to determine how information needs change as students progress through the program. Students who had completed their programs of study would be asked to specify their date of graduation to determine if infomation needs and identifying methodologies varied according to when the students were in graduate school.

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APPENDIX A

QUESTIONNAIRE

If you have not completed your doctoral program please indicate what stage you are in now:

_____ Have completed three quarters or less of coursework
_____ Have completed more than three quarters of coursework, dissertation not begun
_____ Have completed more than three quarter of coursework, dissertation in progress
_____ coursework completed, dissertation in progress

I. Part A. Coursework.

Please answer the questions on Part A of the questionnaire based on your experiences in completing assignments during the coursework phase of your program at the University of Georgia, and not in the completion of your dissertation.

1. To what extent did you use the following methods in identifying the information resources you or needed to complete course assignments:
1-extensively; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. computerized literature search of indexes and abstracts
_____ b. manual literature search of indexes and abstracts
_____ c. manual search of relevant journals
_____ d. subject card catalog in the library
_____ e. the Libraries' online catalog
_____ f. citations found in footnotes and bibliographies of other sources used
_____ g. consultation with faculty
_____ h. consultation with colleagues and other students
_____ i. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ j. other; please specify: _____

2. To what extent did you use the types of information resources listed below to complete your course assignments?
1-extensively; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. books, other than textbooks
_____ b. textbooks used in coursework
_____ c. periodicals/journals
_____ d. curriculum materials written for teachers
_____ e. curriculum materials written for students
_____ f. audiovisual materials (for example: videotapes, audiotapes, videodiscs, audiodiscs, films, filmstrips, records, etc.)
_____ g. instructional computer software
_____ h. statistical computer software packages
_____ i. ERIC Documents on microfiche
_____ j. Government Documents
_____ k. dissertations and theses
_____ l. popular magazines, newspapers, and television programs
_____ m. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ n. other; please specify: _____

3. For those types of information resources listed in the previous question that you did use, to what extent were you able to obtain the information resources you needed from the Main or Science Libraries at the University of Georgia?
1-always; 2-frequently; 3-occasionally; 3-rarely; 5-never

_____ a. books, other than textbooks
_____ b. textbooks used in coursework
_____ c. periodicals/journals
_____ d. curriculum materials written for teachers
_____ e. curriculum materials written for students
_____ f. audiovisual materials (for example : videotapes, audiotapes, videodiscs, audiodiscs, films, filmstrips, records, etc.)
_____ g. instructional computer software
_____ h. statistical computer software packages
_____ i. ERIC Documents on microfiche
_____ j. Government Documents
_____ k. dissertations and theses
_____ l. popular magazines, newspapers, and television programs
_____ m. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ n. other; please specify: _____

4a. If the Main and Science Libraries at the University of Georgia did not own the information resources you needed for your course assignments, did you try to use Interlibrary Loan to obtain those information resources?

_____ 1. extensively
_____ 2. frequently
_____ 3. occasionally
_____ 4. rarely
_____ 5. never

4b. If you did try to use Interlibrary Loan to obtain the information resources you needed, how often were you successful?

_____ 1. extensively
_____ 2. frequently
_____ 3. occasionally
_____ 4. rarely
_____ 5. never

5. If the Main and Science Libraries of the University of Georgia did not own the resources you needed, how often did you use any of the methods listed below to obtain information resources needed to complete course assignments?
1-always; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. borrowed from faculty
_____ b. borrowed from colleagues or other students
_____ c. visited other libraries
_____ d. borrowed from Sciene Education Department collection
_____ e. borrowed from other departmental collections in the College of Education at the University of Georgia
_____ f. purchased information resources myself
_____ g. used an alternate information resource
_____ h. other; please specify: _____

6a. Did you use any of the library services listed below when locating and/or identifying information resources you needed to complete your course assignments?
1-yes; 2-no

_____ a. library instruction (classes concerning or demonstrations of library services, materials, or resources)
_____ b. library orientation (tours of library facilities)
_____ c. assistance from the reference/information desks in either the Main or Science Libraries
_____ d. computerized literature search of the indexes and abstracts
_____ e. Interlibrary Loan

6b. For those library services listed in the previous question that you have used, please rate how useful they were to you when completing your course assignments.
1-very useful; 2-useful; 3-somewhat useful; 4-not useful

_____ a. library instruction
_____ b. library orientation
_____ c. assistance from the reference/information desks in either the Main or Science Libraries
_____ d. computerized literature search of the indexes and abstracts
_____ e. Interlibrary Loan

6c. For the services listed listed below that you did not use, were you?
1-aware of the service, but did not have the funds to pay for it
2-aware of the service, but did not think it would provide me with any useful information
3-aware of the service, but did not take the opportunity to use it
4-not aware of the service at the time

_____ a. library instruction
_____ b. library orientation
_____ c. assistance from the reference/information desks in either the Main or Science Libraries
_____ d. computerized literature search of the indexes and abstracts
_____ e. Interlibrary Loan

If you have not yet begun work on your dissertation, please stop at this point and return the questionnaire to the address on page 10. Thank you for your participation in this project.

II. Part B. Dissertation

Please answer the questions on part B of the questionnaire based on your experiences in planning, conducting, and writing your dissertation as a doctoral student in the Science Education Department at the University of Georgia.

1. To what extent did you use the following methods in identifying the information resources you needed to do your dissertation:
1-extensively; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. computerized literature search of indexes and abstracts
_____ b. manual literature search of indexes and abstracts
_____ c. manual search of relevant journals
_____ d. subject card catalog in the library
_____ e. the Libraries' online catalog
_____ f. citations found in footnotes or bibliographies of other sources used
_____ g. consultation with faculty
_____ h. consultation with colleagues or other students
_____ i. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ j. other; please specify: _____

2. To what extent did you use the types of information resources listed below to do your dissertation?
1-extensively; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. books, other than textbooks
_____ b. textbooks used in coursework
_____ c. periodicals/journals
_____ d. curriculum materials written for teachers
_____ e. curriculum materials written for students
_____ f. audiovisual materials (for example: videotapes, audiotapes, videodiscs, audiodiscs, films, filmstrips, records, etc.)
_____ g. instructional computer software
_____ h. statistical computer software packages
_____ i. ERIC Documents on microfiche
_____ j. Government Documents
_____ k. dissertations and theses
_____ l. popular magazines, newspapers, and television programs
_____ m. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ n. other; please specify: _____

3. For those types of information resources listed in the previous question that you did use, to what extent were you able to obtain the information resources you needed from the Main or Science Libraries at the University of Georgia?
1-always; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. books, other than textbooks
_____ b. textbooks used in coursework
_____ c. periodicals/journals
_____ d. curriculum materials written for teachers
_____ e. curriculum materials written for students
_____ f. audiovisual materials (for example: videotapes, audiotapes, videodiscs, audiodiscs, films, filmstrips, records, etc.)
_____ g. instructional computer software
_____ h. statistical computer software packages
_____ i. ERIC Documents on microfiche
_____ j. Government Documents
_____ k. dissertations and theses
_____ l. popular magazines, newspapers, and television programs
_____ m. materials located in the reference rooms of the Main and/or Science Libraries at the University of Georgia
_____ n. other; please specify: _____

4a. If the Main and Science Libraries at the University of Georgia did not own the information resources you needed for your dissertation research, did you try to use Interlibrary Loan to obtain those information resources?

_____ 1. extensively
_____ 2. frequently
_____ 3. occasionally
_____ 4. rarely
_____ 5. never

4b. If you did try to use Interlibrary Loan to obtain the information resources you needed, how often were you successful?

_____ 1. extensively
_____ 2. frequently
_____ 3. occasionally
_____ 4. rarely
_____ 5. never

5. If the Main and Science Libraries of the University of Georgia did not own the resources you needed, how often did you use any of the methods listed below to obtain information resources needed to do your dissertation?
1-always; 2-frequently; 3-occasionally; 4-rarely; 5-never

_____ a. borrowed from faculty
_____ b. borrowed from colleagues or other students
_____ c. visited other libraries
_____ d. borrowed from Science Education Department collection
_____ e. borrowed from other departmental collections in the College of Education at the University of Georgia
_____ f. purchased information resources myself
_____ g. used an alternate information resource
_____ h. other; please specify: _____

6a. Did you use any of the library services listed below when locating and/or identifying the information resources you needed to do your dissertation?
1-yes; 2-no

_____ a. library instruction (classes concerning or demonstrations of library services, materials, or resources)
_____ b. library orientation (tours of library facilities)
_____ c. assistance from the reference/information desks in either the Main or Science Libraries
_____ d. computerized literature search of the indexes and abstracts
_____ e. Interlibrary Loan

6b. For those library services listed in the previous question that you have used, please rate how useful they were to you when doing your dissertation.
1-very useful; 2-useful; 3-somewhat useful; 4-not useful

_____ a. library instruction
_____ b. library orientation
_____ c. assistance from the reference/information desks in either the Main or Science Libraries
_____ d. computerized literature search of the indexes and abstracts
_____ e. Interlibrary Loan

6c. For those library services listed below that you did not use, were you:

1-aware of the service, but did not have the funds to pay for it
2-aware of the service, but did not think it would provide me with any useful information
3-aware of the service, but did not take the opportunity to use it
4-not aware of the service at the time

_____ a. library instruction
_____ b. library orientation
_____ c. assistance from the information/reference desks
_____ d. computerized literature search
_____ e. Interlibrary Loan

If you have not yet graduated from the doctoral program in science education at the University of Georgia, please stop at this point and return the questionnaire to the address listed on page 10. Thank you for your participation in this project.

III. Part C. Program Completed

Please answer the question in Part C of the questionnaire only if you have competed the doctoral program in science education at the University of Georgia.

1. If you did not use one or more of the library services or information resources listed below while planning, conducting, or writing your dissertation, please indicate which, if any, that you now think might have been useful.

_____ a. computerized literature search of indexes and abstracts
_____ b. assistance from the reference/information desks in either the Main or Science Libraries
_____ c. Government Documents
_____ d. ERIC Documents on microfiche
_____ e. Interlibrary Loan
_____ f. instructional computer software
_____ g. statistical computer software packages
_____ h. library instruction (classes concerning or demonstrations of library services, materials, or resources
_____ i. library orientation (tours of library facilities)
_____ j. the Libraries' online catalog

2. For those library services or information resources listed in the previous question that you did not use while planning, conducting, and writing your dissertation, were you:

1-aware of the service/resource, but did not have the funds to pay for it
2-aware of the service/resource, but did not think it would provide me with any useful information
3-aware of the service/resource, but did not take the opportunity to use it
4-the service/resource was not available while I was a student at the University of Georgia
5-not aware of the serivice/resource at that time

_____ a. computerized literature search of indexes abstracts
_____ b. assistance from the reference/information desks in either the Main or Science Libraries
_____ c. Government Documents
_____ d. ERIC Documents on microfiche
_____ e. Interlibrary Loan
_____ f. instructional computer software
_____ g. statistical computer software packages
_____ h. library instruction
_____ i. library orientation
_____ j. the Libraries' online catalog

Thank you for your participation in this project.

Please return the questionnaire in the enclosed envelope to:

Mary L. Compton
Collection Development, Science Library
Boyd Graduate Studies Building
University of Georgia
Athens, Georgia 30602

by March 1, 1989. Thank you for your cooperation.

Appendix B

COVER LETTER

Collection Development, Science Library
Boyd Graduate Studies Building
University of Georgia
Athens, Georgia 30602
(404) 542-6643

January 17, 1989

Dear Participant,

I am conducting a research project entitled Information Use by Doctoral Students in the Science Education Program at the University of Georgia. I am asking doctoral students, both those who have completed their programs and those who are currently enrolled in the program, to fill out the enclosed questionnaire.

The reason for this reseach is to determine the ways in which doctoral students seek and use information to complete the coursework and dissertation phases of their programs of study.

If you have questions about the research, either now or in during the course of the research project, please contact me at the address and telephone number listed above. A page of participant research information can be found on the verso of this letter.

Please return the questionnaire in the enclosed envelope by March 1, 1989. Thank you for your participation in this project.

Sincerely yours,

Mary L. Compton,
Investigator

Mary L. Compton is a graduate student in Science Education and is doing this applied research project (ESC 765) as part of her program of study. Your participation in her project will certainly be appreciated.

Sincerely,

Kenneth S. Ricker,
Advisor

Participant Research Information

Participation in this project is entirely voluntary. You may withdraw your consent at any time without penalty and have the results of the participation, to the extent it can be identified as yours, returned to you, removed from the experimental records, or destroyed.

A copy of the questionnaire and this letter will be mailed to each participant. Each participant will be asked to fill out the questionnaire and return it to the investigator at the address above. It will take approximately thirty minutes to fill out the questionnaire.

There are no discomforts or stresses associated with this research. There are no risks to the participant associated with this research. The results of this research will be confidential and will not be released in any individually identifiable form without your consent unless required by law.

Research at the University of Georgia which involves human participants is carried out under the oversight of the Institutional Review Board. Questions or problems regarding these activities should be addressed to Ms. Heidi Roof, Coordinator, Human Subjects Research, or Dr. J. B. Jones, Director, Institutional Review Board, Office of V. P. for Research, The University of Georgia, 694A Graduate Studies Research Center, Athens, Georgia 30602, (404) 542-6514 or 542-5938.